CLAIMS

We claim:

1) A method of creating an operational integrated circuit, comprising:

   a. creating a first block comprising a PHEMT enhancement mode transistor on a substrate;

   b. creating a second block comprising a PHEMT depletion mode transistor on the substrate, the second block operatively connected to the first block; and

   c. creating a third block comprising a power pHEMT transistor on the substrate, the third block operatively connected to at least one of the first block and the second block.

2) A method according to claim 1 wherein the operational integrated circuit is created in a single fabrication process.

3) An integrated circuit, comprising:

   a. a first block comprising an enhancement mode pHEMT transistor on a substrate;

   b. a second block comprising a depletion mode pHEMT transistor on the substrate, the second block operatively connected to the first block; and

   c. a third block comprising a power pHEMT transistor on the substrate, the third block operatively connected to at least one of the first block and the second block.

4) An integrated circuit according to claim 3 further comprising:

a. an analog input in communication with at least one of the first block, the second block, and the third block;

b. a clock input in communication with at least one of the first block, the second block, and the third block; and

c. a digital output in communication with at least one of the first block, the second block, and the third block;

d. wherein the first block, the second block, and the third block connect to form an analog to digital converter.

5) An integrated circuit according to claim 3 wherein the integrated circuit is a microwave and millimeter wave integrated circuit (MMIC).

6) A device according to claim 3 wherein the circuit is a circuit capable of operating at a frequency within the range of from very low frequency up to and including X-band frequencies.

7) An analog to digital converter, comprising an enhancement mode pHEMT device, a depletion mode pHEMT device, and a power pHEMT device on a single substrate.

8) An analog to digital converter according to claim 7, wherein the substrate comprises a group III-V element.

9) An analog to digital converter according to claim 8, wherein the substrate comprises gallium arsenide.

10) A plurality of integrated circuits on a single substrate, the plurality of integrated circuits adapted to be interconnected to form a functional block, at least one of the plurality of integrated circuits comprising:

a. a first block, comprising an enhancement mode pHEMT transistor on a substrate;

b. a second block, comprising a depletion mode pHEMT transistor on the substrate, the second block operatively connected to the first block; and

c. a third block, comprising a power pHEMT transistor on the substrate, the third block operatively connected to at least one of the first block and the second block.

11) A plurality of integrated circuits on a single substrate according to claim 10 wherein the plurality of integrated circuits can be interconnected to form a plurality of functional blocks which can be interconnected to create an operational electronic device.